

Translated from the Russian

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**DESCRIPTION OF INVENTION****with Author=s Certificate****SU 313794**

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Applicant: ALeningrad@ Technology Institute, named after Aleningrad's Council@ and decorated with the order of ARed Banner of Labor@

Title in Russian of the object of the invention: STEKLO

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GLASS

The invention pertains to oxygen inorganic types of glass, possessing a high ionic electrical conductance. The invention may find an application in many branches of industry, in particular when used as separating membrane and in electrochemical generators [cells] of electricity (heating elements), for the manufacturing of thermistors, for electrochemical production of ultra-pure alkali metals, and in many other branches of technology wherein the use of inorganic materials, having high ionic conductance is required.

A glass, containing  $\text{SiF}$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{P}_2\text{O}_5$ , is known.

It is an object of the invention to increase the volume resistivity of the glass at room temperature up to  $10^6 - 10^7$  ohm/cm, and to  $10^2 - 10^3$  ohm/cm at 300°C.

The set objective is achieved as a result of the fact that the glass contains the said ingredients in the following percentage, in mol by %:

SiF	40 - 70
Al <sub>2</sub> O <sub>3</sub>	5 - 15
P <sub>2</sub> O <sub>5</sub>	15 - 25,
Li <sub>2</sub> O	10 - 40.

and, besides this,

The ionic electrical conductance of the said glass is 100,00times greater at room temperature, and 1,000 times greater at 300°C in comparison to a sodium-calcium silicate glass, whose chemical stability is comparable, and which contains, the following ingredients, in % by mol:

Na <sub>2</sub> O	20
CaO	10
SiO <sub>2</sub>	70.

The characteristics of silicate and phosphate types of glass, having the following composition , in % by mol:

I		II		III	
Na <sub>2</sub> O	20	LiF	50	LiF	50
CaO	10	Al <sub>2</sub> O <sub>3</sub>	5	Li <sub>2</sub> O	30
SiO <sub>2</sub>	70	P <sub>2</sub> O <sub>5</sub>	15	Al <sub>2</sub> O <sub>3</sub>	5
				P <sub>2</sub> O <sub>5</sub>	15,

Are tabulated as follows:

Glass	Properties		
Composition	glass-melting	glass-melting	volume resistivity ohm/cm°[sic!]

			at room t°	at 150°	at 300°
I	1,450 - 1,500	7	$5 \times 10^{11}$	$2 \times 10^7$	$1 \times 10^5$
II	900	0.5	$1 \times 10^8$	$3 \times 10^5$	$1 \times 10^4$
III	900	0.5	$2 \times 10^6$	$5 \times 10^{3[?]}$	$1 \times 10^2$

The proposed lithium oxyfluorophosphate glass is a low-melting one [fusible] while its melting temperature does not exceed 950°C. It is chemically stable, i.e. non-hygroscopic, and, for practical purposes, it does not dissolve in water. Its capability to crystallize is low.

#### CLAIM

Glass, comprising LiF, Al<sub>2</sub>O<sub>3</sub>, P<sub>2</sub>O<sub>5</sub>, *characterized in that* with an aim to increase the ionic electrical conductance, the glass contains the said ingredients in the following percentage, in % by mol:

	SiF	40 - 70
	Al <sub>2</sub> O <sub>3</sub>	5 - 15
	P <sub>2</sub> O <sub>5</sub>	15 - 25,
and, besides this,	Li <sub>2</sub> O	10 - 40.

Translated by John M Koytcheff, M.Sc.  
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